

Base Year PM_{2.5} Maintenance SIP Point Source Inventory

The PM_{2.5} Maintenance SIP requires a point source inventory for base year evaluation. Base year inventories are used to establish an inventory for the base year that can be compared to future year inventories for the purpose of attainment. The base year inventory selected for this evaluation was the 2017 inventory.

As with all inventories collected for this analysis, the pollutants of concern included PM₁₀, PM_{2.5}, SO₂, NO_x, VOC, CO, and NH₃ and the unit of measurement was tons per year (tpy).

Source Selection:

Industrial point sources are one of the fundamental pieces to this inventory. At the outset of this maintenance SIP project the 2017 triannual inventory was the latest and most current inventory available for point sources. This included all major sources, Title V sources, and any sources included in the PM₁₀ or ozone maintenance plans.

For the SIP base year inventory, UDAQ used the definition of a major source under Title V of the Clean Air Act (as specified in 40 CFR 51.1000) to define the thresholds for the reporting of actual emissions for point sources in the Logan Nonattainment Area. These thresholds are 100 tons per year or more of direct PM_{2.5} or any PM_{2.5} precursor in a moderate nonattainment area for the PM_{2.5} NAAQS. For point sources located in the Provo and Salt Lake Nonattainment Areas however, a threshold of 70 tons per year or more of direct PM_{2.5} or any PM_{2.5} precursor was used. For point sources located in the remaining surrounding areas a threshold for potential to emit annual emissions of 100 tons or more for any of the relevant criteria air pollutants was used. Emissions from sources under the above thresholds were included in the area source base year inventory.

It was determined that according to the above definition that as of 2017 there were no point sources located within the Logan Nonattainment Area. However, according to the above definitions it was determined that as of 2017 there were 54 major sources contained within the modeling domain. Additional sources contained in the modeling domain but located outside of Utah were also identified. Emissions from these 54 major sources support modeled attainment demonstration for the Logan Nonattainment Area. Table 1 lists the 54 major sources in the modeling domain along with their 2017 base year emissions for PM₁₀, PM_{2.5}, SO₂, NO_x, VOC, CO and NH₃.

Table 1. Logan PM_{2.5} Maintenance SIP - 54 Major Point Sources with 2017 Base Year Emissions

| Modeling Area | Count | Company Name | Site ID | Site Name | 2017 Base Year Emissions (tons/yr) | | | | | | |
|-------------------------------|-------|--|---------|--|------------------------------------|-------------------|-----------------|-----------------|---------|----------|-----------------|
| | | | | | PM ₁₀ | PM _{2.5} | SO ₂ | NO _x | VOC | CO | NH ₃ |
| Provo Non-Attainment Area | 1 | Brigham Young University | 10790 | Main Campus | 2.57 | 2.48 | 0.34 | 66.92 | 5.54 | 25.88 | 0.94 |
| | 2 | Geneva Nitrogen Inc. | 10825 | Geneva Nitrogen Plant | 1.98 | 0.66 | 0.03 | 2.68 | 0.29 | 4.50 | 0.17 |
| | 3 | McWane Ductile | 10794 | Utah | 15.95 | 12.21 | 8.66 | 34.42 | 26.80 | 12.44 | 0.75 |
| | 4 | PacifiCorp Energy | 13031 | Lakeside Power Plant | 65.08 | 65.08 | 7.60 | 207.06 | 26.26 | 917.07 | 110.35 |
| Subtotal: | | | | | 85.57 | 80.43 | 16.63 | 311.08 | 58.89 | 959.89 | 112.21 |
| Salt Lake Non-Attainment Area | 5 | ACH Foam Technologies, LLC | 10420 | Expanded Polystyrene Mfg. Plant | 0.06 | 0.06 | 0.00 | 0.73 | 88.42 | 0.61 | 0.02 |
| | 6 | ATK Launch Systems | 10009 | Promontory | 75.77 | 53.12 | 0.79 | 35.83 | 29.93 | 36.59 | 5.70 |
| | 7 | Big West Oil, LLC | 10122 | Big West Oil Refinery | 25.14 | 16.44 | 33.03 | 115.15 | 676.59 | 235.13 | 6.69 |
| | 8 | Bimbo Bakeries USA, Inc. | 10369 | Salt Lake City Bakery | 0.44 | 0.18 | 0.01 | 2.43 | 71.75 | 2.04 | 0.01 |
| | 9 | Chevron Products Co. | 10119 | Salt Lake Refinery | 39.94 | 27.83 | 32.38 | 253.64 | 363.88 | 245.94 | 7.71 |
| | 10 | Compass Minerals International | 10917 | Production Plant | 221.10 | 104.53 | 1.18 | 68.42 | 34.01 | 90.10 | 0.71 |
| | 11 | Hexcel Corporation | 11386 | Salt Lake Operations | 130.69 | 85.28 | 33.14 | 189.68 | 151.11 | 105.03 | 69.35 |
| | 12 | Hill Air Force Base | 10121 | Main Base | 12.92 | 7.63 | 1.58 | 101.43 | 140.24 | 104.80 | 1.72 |
| | 13 | Holly Corp | 10123 | HRMC and HEP Woods Cross Operations | 18.17 | 18.17 | 44.35 | 170.51 | 217.45 | 404.25 | 14.14 |
| | 14 | Kennecott Utah Copper LLC | 10572 | Power Plant Lab Tailings Impoundment | 72.97 | 34.81 | 1036.37 | 460.80 | 6.59 | 36.12 | 1.21 |
| | 15 | Kennecott Utah Copper LLC | 10346 | Smelter & Refinery | 692.99 | 608.35 | 587.95 | 134.16 | 10.82 | 92.03 | 4.80 |
| | 16 | Kennecott Utah Copper LLC | 10571 | Mine & Copperton Concentrator | 1096.41 | 273.71 | 2.70 | 4209.19 | 210.03 | 1357.04 | 1.78 |
| | 17 | Lhoist North America | 10707 | Grantsville Plant | 7.57 | 1.10 | 0.00 | 0.11 | 0.07 | 0.06 | 0.00 |
| | 18 | Nucor Steel | 10008 | Nucor Steel | 45.90 | 32.49 | 80.17 | 182.41 | 31.49 | 688.01 | 2.24 |
| | 19 | Pacificorp Energy | 10355 | Gadsby Power Plant | 8.15 | 5.02 | 0.46 | 38.81 | 2.26 | 27.08 | 4.72 |
| | 20 | Procter and Gamble | 14107 | Paper Manufacturing Plant | 40.91 | 40.69 | 0.38 | 28.31 | 17.30 | 28.18 | 1.21 |
| | 21 | Snowbird Resort LLC | 10406 | Snowbird Ski and Summer Resort | 2.01 | 1.94 | 0.29 | 88.16 | 42.46 | 136.58 | 0.08 |
| | 22 | Tesoro Refining & Marketing Company LLC | 10335 | Salt Lake City Refinery | 160.32 | 99.66 | 499.46 | 313.27 | 230.77 | 255.07 | 3.35 |
| | 23 | University of Utah | 10354 | University of Utah facilities | 10.85 | 10.85 | 0.59 | 41.65 | 8.13 | 38.02 | 2.57 |
| | 24 | Utah Municipal Power Agency | 12495 | West Valley Power Plant | 4.63 | 4.63 | 0.36 | 10.09 | 1.47 | 14.37 | 0.00 |
| | 25 | Vulcraft - Division of Nucor Corporation | 10028 | Steel Products Manufacturing | 17.94 | 7.90 | 0.25 | 6.15 | 42.92 | 6.38 | 0.00 |
| | 26 | Wasatch Integrated Waste Mgt District | 10129 | County Landfill & Energy Recovery Facility | 12.84 | 5.50 | 6.47 | 91.82 | 23.72 | 34.98 | 0.00 |
| Subtotal: | | | | | 2697.71 | 1439.89 | 2361.92 | 6542.75 | 2401.42 | 3938.41 | 128.02 |
| Surrounding Area | 27 | Ash Grove Cement Company | 10303 | Leamington Cement Plant | 116.96 | 100.80 | 19.05 | 1192.02 | 53.01 | 6278.88 | 58.77 |
| | 28 | CCI Paradox Midstream LLC | 10034 | Lisbon Natural Gas Processing Plant | 14.69 | 13.58 | 78.49 | 242.38 | 18.49 | 401.94 | 1.30 |
| | 29 | Clean Harbors Aragonite LLC | 10725 | Hazardous Waste Storage Incineration | 3.73 | 1.78 | 23.87 | 126.60 | 5.87 | 43.53 | 0.00 |
| | 30 | Dugway Proving Ground U.S. Army | 10706 | Dugway Proving Ground | 677.71 | 71.01 | 0.85 | 13.55 | 10.12 | 102.88 | 0.13 |
| | 31 | Energy Fuels Resources (USA) Inc. | 14010 | Tony M. Mine | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 32 | EnerVest Operating | 12929 | Sage Brush Flat Compressor Station | 2.41 | 2.41 | 0.14 | 15.28 | 20.74 | 3.05 | 0.00 |
| | 33 | EnerVest Operating L.L.C. | 12948 | Dry Canyon Compressor Station | 2.53 | 2.53 | 0.08 | 7.40 | 14.34 | 9.79 | 0.04 |
| | 34 | EnerVest Operating L.L.C. | 13284 | Interplanetary Compressor Station | 3.38 | 3.38 | 0.11 | 5.13 | 13.30 | 7.13 | 0.00 |
| | 35 | Genpak Corporation | 11767 | Polystyrene Foam Production Facility | 0.56 | 0.56 | 0.01 | 1.08 | 71.08 | 0.46 | 0.21 |
| | 36 | Graymont Western US Incorporated | 10313 | Crickit Mountain Plant | 277.29 | 135.63 | 17.56 | 568.99 | 12.34 | 278.82 | 25.82 |
| | 37 | Hill Air Force Base | 11284 | Utah Test and Training Range | 170.44 | 62.62 | 0.83 | 14.17 | 3.52 | 5.04 | 0.08 |
| | 38 | Holcim (US) Inc. | 10007 | Devil's Slide Plant | 72.09 | 15.53 | 196.24 | 1426.83 | 45.11 | 1059.51 | 3.95 |
| | 39 | Intermountain Power Service Corporation | 10327 | Intermountain Generation Station | 983.45 | 923.90 | 2483.62 | 9333.37 | 9.65 | 964.59 | 1.65 |
| | 40 | Kern River Gas Transmission Company | 12512 | Veyo Compressor Station | 7.02 | 7.02 | 0.25 | 70.83 | 5.51 | 11.47 | 0.01 |
| | 41 | Kinder Morgan Altamont LLC | 10209 | Altamont East Compressor Station | 6.71 | 6.71 | 0.18 | 451.58 | 55.90 | 84.66 | 0.01 |
| | 42 | Kinder Morgan Altamont LLC | 10210 | Altamont West Compressor Station | 1.50 | 1.50 | 0.05 | 312.56 | 34.66 | 20.65 | 0.00 |
| | 43 | Kinder Morgan Altamont LLC | 10211 | Altamont South Compressor Station | 5.41 | 5.41 | 0.15 | 397.14 | 41.60 | 64.38 | 0.00 |
| | 44 | Materion Natural Resources | 10311 | Delta Mill | 22.78 | 4.44 | 0.44 | 13.70 | 6.21 | 8.86 | 82.50 |
| | 45 | Northwest Pipeline GP | 10259 | Cisco Compressor Station | 0.08 | 0.08 | 0.28 | 2.56 | 0.04 | 1.09 | 0.00 |
| | 46 | Northwest Pipeline GP | 10627 | Moab Compressor Station | 0.60 | 0.60 | 0.21 | 34.48 | 1.31 | 4.94 | 0.00 |
| | 47 | PacifiCorp Energy | 12524 | Currant Creek Power Plant | 24.23 | 24.23 | 2.74 | 157.68 | 10.02 | 297.96 | 40.91 |
| | 48 | PacifiCorp | 10237 | Hunter Power Plant | 503.92 | 385.33 | 3511.61 | 9776.71 | 119.75 | 3158.09 | 1.36 |
| | 49 | PacifiCorp | 10238 | Huntington Power Plant | 474.01 | 218.81 | 2280.98 | 5934.58 | 74.78 | 5107.68 | 0.82 |
| | 50 | Questar Pipeline LLC | 11532 | Kastler Marushack Compressor Station | 4.37 | 4.37 | 0.72 | 639.15 | 44.79 | 28.03 | 2.85 |
| | 51 | St. George City Power | 10892 | Red Rock Power Generation Station | 3.32 | 3.32 | 0.36 | 15.99 | 2.85 | 6.01 | 0.00 |
| | 52 | Sunnyside Cogeneration Associates | 10096 | Sunnyside Cogeneration Facility | 60.53 | 39.87 | 477.05 | 430.77 | 25.39 | 42.76 | 0.15 |
| | 53 | US Magnesium LLC | 10716 | Rowley Plant | 824.69 | 621.84 | 6.79 | 1061.59 | 660.26 | 323.05 | 1.82 |
| | 54 | Utelite Corporation | 10676 | Shale Processing | 89.27 | 37.69 | 137.22 | 211.45 | 2.32 | 9.27 | 0.03 |
| Subtotal: | | | | | 4353.66 | 2694.96 | 9239.88 | 32457.54 | 1362.95 | 18324.51 | 222.38 |

Data Collection and QA/QC

UDAQ has recently improved emissions inventory data management with the development and implementation of the State and Local Emissions Inventory System (SLEIS). This new system has established an online emissions inventory system, whereby point sources can submit their air emissions inventories to UDAQ. SLEIS includes extensive built-in calculation capabilities which simplify the process and reduce the workload for point sources required to submit an emissions inventory. SLEIS also contains extensive QA/QC which guides point sources as they submit their data, thereby greatly reducing oversight required by UDAQ staff. The 2017 triannual emissions inventory was submitted to UDAQ by point sources using the SLEIS online system. The submitted emissions inventories were thoroughly reviewed using additional QA/QC by UDAQ staff before being finalized. The extensive QA/QC contained in the SLEIS online system along with the review performed by UDAQ staff greatly surpasses EPA guidance requiring 10% QA/QC as the minimum criteria necessary for a SIP inventory. It should be noted that CCI Paradox – Lisbon Natural Gas Processing Plant which is located in the Surrounding Area did not operate and therefore submitted an inventory listing zero emissions for calendar year 2017. This was due to reconstruction and equipment installation at the facility which then began operating again in 2018. However, the facility was operating during 2016 which was also the base year for the PM_{2.5} Serious SIP. Therefore, it was determined that the 2016 emissions inventory for CCI Paradox – Lisbon Natural Gas Processing Plant would be used in lieu of their 2017 emissions inventory for the PM_{2.5} Maintenance SIP 2017 base year. It should be noted that Energy Fuel Resources (USA) Inc. – Tony M. Mine which is located in the surrounding area has not operated since 2012. UDAQ staff anticipated that the facility would eventually shut down according to past communication with source representatives. However, the source submitted a notice of intent and the Approval Order (AO) for Energy Fuel Resources (USA) Inc. – Tony M. Mine was updated in 2018. At that time representatives for the source indicated that start-up of the mine was a possibility at some point in the future. Therefore, since the source did not operate in 2017 UDAQ used zero emissions for Energy Fuel Resources (USA) Inc. – Tony M. Mine for the 2017 base year. The 2017 triannual point source emissions inventory data from SLEIS is contained in the PM_{2.5} Maintenance SIP workbooks. The 2016 emissions inventory for CCI Paradox – Lisbon Natural Gas Processing Plant is contained in a separate electronic workbook. This data is available in electronic format upon request.

Emissions data for any additional sources contained in the modeling domain but located outside of Utah was obtained from the EPA National Emission Inventory (NEI) database (2014 NEI v2).

The 2017 inventory was reported and compiled in terms of tons per year (tpy). Since the PM_{2.5} Maintenance SIP is designed to protect the 24-hour standard, the model (CAMx) evaluates emissions on an hourly basis. It uses a pre-processor called SMOKE in order to convert the annual inventory to a 24-hour basis (explained in further detail below).

Because the model is evaluating the buildup of PM_{2.5} concentrations over the span of multi-day episodes, an (annual) inventory worksheet was used to develop each episode day. This stands in contrast to the mobile source portion of the inventory wherein differences between weekdays and weekends (among other factors) will result in daily variations.

Condensable Particulate Emissions:

Condensable particulate matter (PM) is material that is vapor phase at stack conditions, but which condenses and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM after discharge from the stack. Note that all condensable PM, if present, is typically in the PM_{2.5} size fraction, and therefore all of it is a component of both primary PM_{2.5} and primary PM₁₀. Condensable emissions were included in the inventories submitted by the sources in 2017.

The SMOKE Emissions Model and Processor

The emissions processing model, SMOKE, takes the annual, county wide emissions inventory prepared by UDAQ and reformulates it for use in the air quality model. There are three aspects to this reformulation of the inventory that, in the end, produces a refined version of the inventory. These include temporal processing, spatial processing, and speciation. Temporal processing converts emissions from annual to daily and hourly values. Spatial processing locates emissions from the county to specific grid cells within the modeling domain. Speciation breaks PM and VOC emissions into their component subspecies.

The emissions processing for air quality modeling is done with sets of activity profiles based on various Source Classification Codes (SCCs) and associated cross reference files developed using source provided temporal data. This feature essentially establishes the level of detail required of the point source inventories, wherein each “source component” has with it an associated SCC. These SCCs and the cross reference files are also created for area sources and mobile sources.

Once developed, these activity profiles serve to establish the temporal allocation of emissions within the model (e.g. 8-hour workdays), and also determine the speciation of PM and VOC emissions.